

Client's ref. :AU91124
Our ref: 0632-8695US/final/王瑞卿/ Steve

What is claimed is:

1 1. A method for inspecting crystal quality of a
2 polysilicon film, comprising the steps of:
3 providing a substrate covered by a polysilicon layer;
4 irradiating a light beam having a predetermined
5 wavelength through a beam splitter to separate
6 into a first light beam and a second light beam,
7 for irradiating the polysilicon layer;
8 detecting the light intensity of the first light beam
9 and the light intensity of the second light beam
10 reflected from the polysilicon layer to achieve a
11 light intensity ratio; and
12 monitoring crystal quality of the polysilicon layer by
13 the light intensity ratio.

1 2. The method as claimed in claim 1, wherein the
2 substrate is a glass substrate.

1 3. The method as claimed in claim 1, wherein the
2 light beam is a laser beam and the predetermined wavelength
3 is about 266~316 nm.

1 4. The method as claimed in claim 3, wherein a split
2 ratio of the first light beam to the second light beam is
3 30~40%:70~60%.

1 5. An apparatus for inspecting crystal quality of a
2 polysilicon film, comprising:

3 a probe light beam having a predetermined wavelength
4 for irradiating a polysilicon layer formed on a
5 substrate;

6 a beam splitter for receiving the probe light beam to
7 separate into a first light beam and a second
8 light beam, which is used for irradiating the
9 polysilicon layer;

10 a first detecting device for detecting the light
11 intensity of the first light beam; and

12 a second detecting device for detecting the light
13 intensity of the second light beam reflected from
14 the polysilicon layer.

1 6. The apparatus as claimed in claim 5, further
2 comprising a controlling unit coupled between the first and
3 second detecting devices to monitor crystal quality of the
4 polysilicon layer by a light intensity ratio of the first
5 light beam to the second light beam reflected from the
6 polysilicon layer.

1 7. The apparatus as claimed in claim 5, wherein the
2 probe light beam is a laser beam and the predetermined
3 wavelength is about 266~316 nm.

1 8. The apparatus as claimed in claim 5, wherein the
2 substrate is a glass substrate.

1 9. The apparatus as claimed in claim 5, wherein a
2 split ratio of the first light beam to the second light beam
3 is 30~40%:70~60%.

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1 10. A method for controlling crystal quality of a
2 polysilicon film, comprising the steps of:

3 providing a first substrate covered by a first
4 amorphous silicon layer;

5 annealing the first amorphous silicon layer by a laser
6 beam with different first predetermined laser
7 energy densities to form a plurality of
8 polysilicon regions therein;

9 irradiating a probe light beam having a predetermined
10 wavelength through a beam splitter to separate
11 into a first light beam and a second light beam,
12 for irradiating the polysilicon regions;

13 detecting the light intensity of the first light beam
14 and the light intensity of the second light beam
15 reflected from each polysilicon region to achieve
16 a plurality of light intensity ratios;

17 determining a second predetermined laser energy density
18 by the light intensity ratios;

19 providing a second substrate covered by a second
20 amorphous silicon layer; and

21 annealing the second amorphous silicon layer by the
22 laser beam with the second predetermined laser
23 energy density to form a polysilicon layer on the
24 second substrate.

1 11. The method as claimed in claim 10, wherein the
2 first and second substrates are glass substrates.

1 12. The method as claimed in claim 10, wherein the
2 laser beam is an excimer laser beam.

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1 13. The method as claimed in claim 12, wherein the
2 first predetermined laser energy densities are about 300~500
3 mJ/cm².

1 14. The method as claimed in claim 10, wherein the
2 probe light beam is a laser beam and the predetermined
3 wavelength is about 266~316 nm.

1 15. The method as claimed in claim 10, wherein a split
2 ratio of the first light beam to the second light beam is
3 30~40%:70~60%.

1 16. The method as claimed in claim 10, wherein the
2 second predetermined laser energy density is one of the
3 first laser energy densities which can form the polysilicon
4 layer with the largest grain size.